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Shaw™ Shaw Environmental, Inc.

January 22, 2004
Project 100088

Mr. Norman Hepner
Washington State Department of Ecology
Toxics Cleanup Program
15 W. Yakima Ave, Suite 200
Yakima, Washington 98902

Re: Response to Comments Pertaining to Cleanup of Mineral Oil-Impacted Soils from Ruptured Transformer at Hyak Tower Site (Site Number 89535), Keechelus Ridge, Washington

Dear Mr. Hepner:

Shaw Environmental, Inc. (Shaw), on behalf of American Tower Corporation, has prepared this letter in response to Ecology's comments regarding the request for a No Further Action (NFA) determination for the cleanup of mineral oil-impacted soils at the Hyak Tower site on Keechelus Ridge, near Hyak, Washington.

Ecology Comments - Based on telephone and email communications with you on January 20-22, 2004, you have indicated that Ecology has the following concerns with the cleanup report and NFA request:

1. No terrestrial ecological evaluation was performed.

2. Confirmation sample CS-comp:082603 contained a mineral oil concentration of 3,960 milligrams per kilogram (mg/kg). Although this concentration is below the MTCA Method A soil cleanup level, since the sample was a composite of eight locations, one or more of the individual locations could theoretically have residual concentrations exceeding the MTCA cleanup level.

Response – The following is a response to Ecology's comments, which should satisfy any concerns pertaining to this site.

1. Terrestrial Ecological Evaluation: The total measured area of impacted surface soil at the Hyak Tower site was approximately 150 square feet. WAC 173-340-7492(2)(a)(i) states that "The evaluation may be ended at a site where: (i) The total area of soil contamination at the site is not more than 350 square feet." Under this criterion, as stated in WAC 173-340-7492(1)(c), "no further evaluation is necessary to conclude that a site does not pose a substantial threat of significant adverse effects to terrestrial ecological receptors."

2. Residual Impacted Soil: Per your email, dated January 20, 2004, you indicated that utilizing the following options would satisfy concerns about residual concentrations of mineral oil at the site:

   a. Conduct a mass-balance analysis of the transformer oil remaining and a model/professional opinion on the length of time to bioremediate to below the Method A cleanup value. If Ecology concurs with your analysis, no confirmation samples will be required.

   b. Provide a Method B analysis (MTCATPH10 worksheet) demonstrating that a worst-case 40,000 mg/kg of mineral oil is not an ingestion hazard, and then provide the mass balance analysis and a statement that groundwater and surface waters are not susceptible to contamination (the 4,000 mg/kg is for protection of groundwater).

   Mass Balance: A mass-balance calculation was performed (Attachment A), comparing the total known quantity of mineral oil released at the site to the quantity removed during the remedial excavation. Very conservative values were used to perform the calculation (e.g., 35 gallons was used as the spilled volume of mineral oil, even though the roughly 35-gallon transformer was observed to be approximately half full when removed for disposal). Two separate calculations were performed to identify the amount of mineral oil remaining on site. As shown in calculation 4a (using the average soil concentration value from the initial site characterization), essentially all mineral oil was removed from the site. In calculation 4b, the lowest concentration identified during the site characterization was used as a conservative value, which resulted in a maximum residual volume of 2.5 gallons of mineral oil (again this assumes the entire contents of the transformer were released). Both calculations indicate that only a *de minimis* amount of mineral could possibly remain on the site. It is Shaw's professional opinion that the residual mineral oil does not pose a threat to human health or environment and that natural degradation of the oil to negligible concentrations would likely occur within one year.

   Method B Analysis: Due to software version incompatibility problems, Shaw was unable to properly run Ecology's MTCATPH10 spreadsheet. However, when Shaw relayed the input parameters (Attachment 2) to you over the telephone (January 22, 2004), the model indicated that a worst-case scenario at this site of 32,000 mg/kg of mineral oil (based on eight locations collected for the composite sample multiplied by analytical result of 3,960 mg/kg) does not provide a soil direct contact hazard. The site is located at the apex of Keechelus Ridge, a basaltic ridge approximately 2,500 feet above Keechelus Lake and Kachess Lake. The nearest surface water is Baker Lake, approximately 1/3 mile northeast, which is approximate 520 feet in elevation below the site. Based on geology and the location/elevation of local surface water,

groundwater is not likely to be within 100 feet of the ground surface at the site; therefore, impacted soil at the site is not likely to impact groundwater or surface water.

Based on the results and calculations provided in this letter, Shaw believes that Ecology's comments and concerns have been adequately addressed, and that this site poses no significant threat to human health or the environment. Therefore, Shaw reiterates its request to Ecology to provide an NFA determination for this site.

We appreciate Ecology's assistance and responsiveness to our inquiries and request. Please feel free to contact us with any additional questions or if we can be of further assistance.

Sincerely,

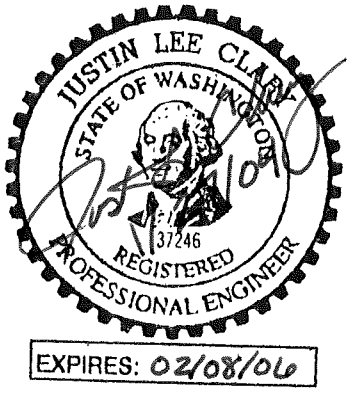
SHAW ENVIRONMENTAL, Inc.

Piper Roelen, EIT
Project Engineer

Justin Clary, P.E.
Project Engineer

Attachments: A – Mass-Balance Calculations
B – Input Parameters for MTCA Method B Analysis

cc: Mr. Scot Sandefur; American Tower Corporation



ATTACHMENT A

MASS-BALANCE CALCULATIONS

Shaw™ Shaw Environmental, Inc.

By P. Roelen Date 1/21/04 Subject Mass Balance - Hyak Tower Sheet No. 1 of 2

Chkd. By [signature] 1/22/04 Date _____ Proj. No. 100088

.25 in. X .25 in.

GIVEN:

Transformer fluid capacity = ~35 gallons mineral oil

Quantity of soil removed = 4.49 tons = 4073 kg (disposal manifest)

Soil sample mineral oil concentrations: SS-1: 0-4" = 26,200 mg/kg
(from site characterization - lab analytical) SS-2: 0-5" = 70,900 mg/kg
SS-3: 0-4" = 29,500 mg/kg
Avg. = 43,200 mg/kg

Specific gravity of heating oil = 0.875 g/cm³ (avg. value - Fischer Scientific MSDS)

OBJECTIVE:

Determine quantity of mineral oil remaining in site soils via mass balance calculations.

SOLUTION:

1) Quantity oil remaining = Quantity spilled - Quantity excavated

2) Quantity spilled = 35 gal.* $\left(\frac{3785\ cm^3}{gal}\right)\left(\frac{0.875\ g}{cm^3}\right)\left(\frac{1\ kg}{1000\ g}\right)$

= 115 kg mineral oil

* Very conservative. Transformer was observed to contain approx. half its contents when removed from site for disposal.

3) a. using avg. soil conc.

Quantity excavated = 4073 kg-soil $\left(43{,}200\ \frac{mg}{kg}\right)\left(\frac{1 \times 10^{-6}\ kg}{mg}\right)$

= 175.95 kg mineral oil

b. using conservative soil conc. (SS-1: 0-4")

Quantity excavated = 4073 kg-soil $\left(26{,}200\ \frac{mg}{kg}\right)\left(1 \times 10^{-6}\ \frac{kg}{mg}\right)$

= 106.71 kg mineral oil

Shaw™ Shaw Environmental, Inc.

By P. Roelen Date 1/21/04 Subject Mass Balance (cont.) Sheet No. 2 of 2

Chkd. By JJC 1/22/04 Date _____ Proj. No. 100088

.25 in. X .25 in.

4) Quantity oil remaining:

a. using avg. soil conc. => 115 kg spilled - 175.95 kg excavated
= -60.95 kg

=> **all mineral oil essentially removed**

b. using conservative soil conc. => 115 kg spilled - 106.71 kg excavated
= 8.29 kg remaining

=> volume remaining = $8.29\ kg \left(\frac{1\ cm^3}{0.875\ g}\right)\left(\frac{1000\ g}{kg}\right)\left(\frac{1\ gal}{3785\ cm^3}\right)$

= **2.5 gal mineral oil remaining**

ATTACHMENT B

INPUT PARAMATERS FOR MTCA METHOD B ANALYSIS

Washington State Department of Ecology, Toxics Cleanup Program: Soil Cleanup Level for TPH Sites - Main Data Entry Form and Status of Current Soil Risk

Soil Cleanup Levels: Worksheet for Data Entry

Refer to WAC 173-340-720, 740,745, 747, 750

Date: 01/20/04
Site Name: Hyak Tower Site - Keechelus Ridge
Sample Name: Kittitas County, WA

1. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0	0.00%
AL_EC >6-8	0	0.00%
AL_EC >8-10	0	0.00%
AL_EC >10-12	0	0.00%
AL_EC >12-16	0	0.00%
AL_EC >16-21	16,000	50.00%
AL_EC >21-34	16,000	50.00%
AR_EC >8-10	0	0.00%
AR_EC >10-12	0	0.00%
AR_EC >12-16	0	0.00%
AR_EC >16-21	0	0.00%
AR_EC >21-34	0	0.00%
Benzene	0	0.00%
Toluene	0	0.00%
Ethylbenzene	0	0.00%
Total Xylenes	0	0.00%
Total Naphthalenes	0	0.00%
n-Hexane	0	0.00%
MTBE	0	0.00%
Ethylene Dibromide (EDB)	0	0.00%
1,2 Dichloroethane (EDC)	0	0.00%
Benzo(a)anthracene	0	0.00%
Benzo(b)fluoranthene	0	0.00%
Benzo(k)fluoranthene	0	0.00%
Benzo(a)pyrene	0	0.00%
Chrysene	0	0.00%
Dibenzo(a,h)anthracene	0	0.00%
Indeno(1,2,3-cd)pyrene	0	0.00%
Sum	32000	100.00%

2. Enter Site-Specific Hydrogeological Data

Total soil porosity: default is 0.43	0.43	Unitless
Volumetric water content: default is 0.3	0.3	Unitless
Volumetric air content: default is 0.13	0.13	Unitless
Soil bulk density measured: default is 1.5	1.5	kg/l
Fraction Organic Carbon: default is 0.001	0.001	Unitless
Dilution Factor: default is 20	20	Unitless

Exposure Pathway		Pass or Fail?	HI	RISK
Soil Direct Contact	Unrestricted Land use			
	Industrial Land use			
Method B Potable Ground Water Protection				

Warning!!!
*Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required based on site-specific conditions and type of fuel (see WAC 173-340-7490~7494).
*Check Soil Residual Saturation Evaluation specified in WAC 173-340-747(10).

Note:

1. All data must be numeric values. Use of alphabetical characters (i.e., "ND", "NA", "<", ">", or "=") will cause an error.
2. Try to avoid double counting: The Petroleum Equivalent Carbon (EC) fractions include many individual substances that must be analyzed separately. When entering the concentration of petroleum EC fraction into the data entry cell, make sure you subtract the concentration of individual substances from the appropriate EC fraction. (See User's Guide)
3. For the values of soil measurement below the method detection limit, substitute one-half the method detection limit as required by WAC173-340-740-(7). For the values for soil measurement above the method detection limit but below the practical quantitation limit, substitute the method detection limit. However, for a hazardous substance or petroleum fraction which has never been detected in any sample at a site and these substances are not suspected of being present at the site based on site history and other knowledge, enter "0" for that hazardous substances or petroleum fraction for further calculation. Refer to WAC173-340-740(7) for detail.
4. For detail analytical testing requirements for petroleum contaminated sites, refer to WAC 173-340-820, 830 and 840, and Table 830-1.
5. For detail information on site-specific hydrogeological conditions, refer to WAC 173-340-747.

REMARK:
Petroleum EC fractions based on approximate mineral oil analytical range. Total concentration (32,000 mg/kg) based on 8 locations used for composite sample multiplied by analytical result for composite sample (3,960 mg/kg). [8 x 3,960 mg/kg = 31,680]

Default values used used for input of hydrogeological data.

Worksheet for Calculating Soil Cleanup Level for Soil Direct Contact pathway: Method B-Unrestricted Land use (Refer to WAC 173-340-740)

Date: 1/20/04
Site Name: Hyak Tower Site - Keechelus Ridge
Sample Name: Kittitas County, WA

a. "TPH Test" button below is for testing adjusted condition at a specified TPH concentration.
b. Check columns at left for Pass/Fail detail.

Chemical of Concern or EC Group	Measured Soil Conc dry basis	Exposure Parameters				Toxicity Parameters		Current Condition			Adjusted Condition			
		AB1	AF	ABS_d	GI	RfD_o	CPF_o	HQ	RISK	Pass or Fail?	Soil Conc being tested	HQ	RISK	Pass or Fail?
	mg/kg	unitless	mg/cm^2-day	unitless	unitless	mg/kg-day	kg-day/mg	unitless	unitless		mg/kg	unitless	unitless	
Petroleum EC Fraction														
AL_EC >5-6	0	1	0.2	0.03	0.8	5.7					0.00E+00			
AL_EC >6-8	0	1	0.2	0.03	0.8	5.7					0.00E+00			
AL_EC >8-10	0	1	0.2	0.03	0.8	0.03					0.00E+00			
AL_EC >10-12	0	1	0.2	0.03	0.8	0.03					0.00E+00			
AL_EC >12-16	0	1	0.2	0.1	0.5	0.03					0.00E+00			
AL_EC >16-21	16000	1	0.2	0.1	0.5	2		1.44E-01			2.43E+03	2.18E-02		
AL_EC >21-34	16000	1	0.2	0.1	0.5	2		1.44E-01			2.43E+03	2.18E-02		
AR_EC >8-10	0	1	0.2	0.03	0.8	0.05					0.00E+00			
AR_EC >10-12	0	1	0.2	0.03	0.8	0.05					0.00E+00			
AR_EC >12-16	0	1	0.2	0.1	0.5	0.05					0.00E+00			
AR_EC >16-21	0	1	0.2	0.1	0.5	0.03					0.00E+00			
AR_EC >21-34	0	1	0.2	0.1	0.5	0.03					0.00E+00			
Benzene	0	1	0.2	0.0005	0.95	0.003	0.055		0.00E+00		0.00E+00		0.00E+00	
Toluene	0	1	0.2	0.03	1	0.2					0.00E+00			
Ethylbenzene	0	1	0.2	0.03	0.92	0.1					0.00E+00			
Total Xylenes	0	1	0.2	0.03	0.9	2					0.00E+00			
Total Naphthalenes	0	1	0.2	0.13	0.89	0.02					0.00E+00	0.00E+00		
n-Hexane	0	1	0.2	0.03	0.8	0.06					0.00E+00	0.00E+00		
MTBE	0										0.00E+00			
Ethylene Dibromide (EDB)	0	1	0.2	0.03	0.8	0.000057	85		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	1	0.2	0.03	0.8	0.03	0.091		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	0	1	0.2	0.13	0.89		0.73		0.00E+00	*for*	0.00E+00		0.00E+00	*for*
Benzo(b)fluoranthene	0	1	0.2	0.13	0.89		0.73		0.00E+00	*all*	0.00E+00		0.00E+00	*all*
Benzo(k)fluoranthene	0	1	0.2	0.13	0.89		0.73		0.00E+00	*cPAHs*	0.00E+00		0.00E+00	*cPAHs*
Benzo(a)pyrene	0	1	0.2	0.13	0.89		7.3		0.00E+00		0.00E+00		0.00E+00	
Chrysene	0	1	0.2	0.13	0.89		0.073		0.00E+00		0.00E+00		0.00E+00	
Dibenzo(a,h)anthracene	0	1	0.2	0.13	0.89		2.92		0.00E+00		0.00E+00		0.00E+00	
Indeno(1,2,3-cd)pyrene	0	1	0.2	0.13	0.89		0.73		0.00E+00		0.00E+00		0.00E+00	
Sum	**32000**							2.88E-01	0.00E+00		4.85E+03	4.37E-02	0.00E+00	

Current Condition

TPH, mg/kg= 32000.000
HI= 2.880E-01
Cancer RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

Adjusted Condition

TPH, mg/kg= 4854.369
HI= 4.369E-02
Cancer RISK= 0.000E+00
Pass or Fail? Pass
Check Residual Saturation (WAC340-747(10))

Exposure Parameters		
for Non-carcinogens		Units
Average Body Weight, ABW	16	kg
Averaging Time, AT	6	yr
Exposure Frequency, EF	1	unitless
Exposure Duration, ED	6	yr
Soil Ingestion Rate, SIR	200	mg/day
Dermal Surface Area, SA	2200	cm^2
for Carcinogens		
Averaging time, AT_C	75	yr